

Predictors of Emotional Adjustment following Traumatic Injury: Personal, Social, and Material Resources

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Abbreviations:

AAQ = Acceptance and Avoidance Questionnaire
CES-D = Center for Epidemiologic Studies Depression Scale
COR-E = Conservation of Resources-Evaluation
PCL-C = PTSD Checklist-Civilian
PTSD = Post-traumatic Stress Disorder
SCS = Social Constraints Scale
SUMC = Stanford University Medical Center

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Abstract

Introduction: The identification of factors influencing emotional adjustment after injury may elucidate the design of assessment and treatment procedures in emergency medicine settings and suggest targets for early intervention to prevent the later development of psychological impairment. Personal, social, and material resources may be influential factors and require further evaluation.

Hypotheses: Greater experiential avoidance, social constraints on discussing the trauma experience, and loss of material resources would be associated with more of the symptoms of post-traumatic stress and depression following traumatic injury.

Methods: Participants ($n = 47$) at a mean of 7.4 months post-injury, completed a telephone interview assessment, including evaluation of socio-demographic characteristics, conservation of resources, social constraints, acceptance and commitment, and symptoms of post-traumatic stress disorder (PTSD) and depression. Hypotheses were tested using multivariate regression analyses.

Results: Only greater social constraints were uniquely predictive of greater PTSD symptomatology. Higher levels of experiential avoidance, social constraints, and loss of material resources all were associated with greater levels of depression.

Conclusion: Assessment of personal coping style, receptivity of social network, and loss of potential material resources following traumatic injury may facilitate identification of individuals at-risk for poorer post-injury adaptation. Psychosocial interventions targeting such individuals may be promising.

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Introduction

Although hospital emergency departments and trauma centers provide injured patients with immediate access to sophisticated medical care, psychological distress and other problems of post-trauma adaptation are not addressed systematically by trauma interventions. Yet, hospital treatment for physical injuries may be associated with significant levels of emotional disturbance. Survivors of motor-vehicle crashes and other unintentional injuries exhibit high rates of post-traumatic stress disorder (PTSD),¹⁻⁴ depression,⁵ and other psychiatric and substance-use disorders.⁶ Further, the physical and psychiatric sequelae of traumatic injuries are associated with enduring functional impairments and diminished quality of life.⁷⁻¹⁰ Identification of factors influencing emotional adjustment after injury may inform design of assessment and treatment procedures in emergency medicine settings, and suggest targets for early

intervention to prevent the later development of psychological impairment.

Several risk factors for poorer post-injury emotional adaptation have been identified. Characteristics of the person, including female gender,¹⁻⁴ younger age,³ prior mental-health problems,^{1,3} prior physical illness,³ and prior trauma history⁴ have been linked to poorer adaptation following physical injuries. The characteristics of the trauma, such as degree of exposure,¹¹ severity of the trauma,¹ and the need for hospitalization² also may confer increased risk for the development of psychosocial dysfunction. Peri-traumatic and immediate post-trauma risk factors include greater perceived threat,¹⁻² peri-traumatic dissociation,¹² and high distress in the initial post-trauma period.^{4,12} Post-trauma experiences such as poor social support¹³ and involvement in litigation¹⁻² also have been linked to increased post-injury distress. Despite investigations of risk factors, identified variables leave a large proportion of the variance in post-injury distress unaccounted and suggest a need for continued, theory-driven investigation.

Emotional, social, and material resources potentially are important predictors of post-injury adaptation, and have not been evaluated thoroughly. Emotional and social resources particularly are important in the context of cognitive and emotional processing theories of adjustment to trauma.¹⁴⁻¹⁶ Cognitive-emotional processing encompasses the mental tasks of contemplating, confronting, and integrating traumatic experiences into one's view of oneself and the world and for reaching emotional resolution. A failure to bring this new information into accord with prior cognitive structures or to modify previous beliefs to account for the new information may result in prolonged cognitive (e.g., intrusive thoughts, nightmares), behavioral (e.g., avoidance, social withdrawal), emotional (e.g., numbing, distress), and/or physiological disturbances (e.g., arousal, sleep disruption).¹⁷

The ability to accept strong negative emotions and take action in the face of painful affective experiences may impact adjustment to traumatic events.¹⁸ Following a traumatic experience, one may have a range of natural emotional experiences, such as sadness, anxiety, fear, and painful memories. Negative appraisal of these private states (e.g., as dangerous in and of themselves) may lead to avoidance of injury-related feelings and thoughts through attempts at emotional control and suppression.¹⁹ While these avoidance maneuvers may relieve immediate distress, they may interfere with cognitive-emotional processing and the ability to take action that is consistent with healing from the traumatic experience.¹⁸ Indeed, negative interpretation of intrusive thoughts, attempts at thought suppression, and avoidant coping mechanisms all have been associated with greater post-injury distress.^{2,20}

Given that post-injury adaptation occurs in an interpersonal context,²¹ social resources may also impact outcomes. Social-cognitive processing models of adjustment to trauma suggest that adaptation to injury may be facilitated by opportunities to talk with others about the experience.²²⁻²⁴ Such discussion may activate thoughts and emotions related to the injury, elicit supportive and corrective feedback,

and provide opportunities to understand the experience differently.^{23,24} However, when attempts to talk about trauma-related thoughts, feelings, or concerns are met with resistance from one's social network, processing of trauma-related information is inhibited. Such social constraints may cause individuals to avoid thinking or talking about the experience, reducing opportunities for cognitive-emotional processing, and resulting in prolonged distress.²² Consistent with this hypothesis, both self-disclosure²⁵ and extent of cognitive processing²⁶ have been associated with positive post-trauma adjustment.

Material resource loss may be another important factor influencing post-injury adaptation. The Conservation of Resource theory²⁷ predicts that distress and other negative outcomes of injury will be related to the extent to which individuals are able to maintain personally significant resources. Economic stress imposed by loss of material resources such as food, clothing, money, or transportation may be particularly problematic in that it may interfere with many aspects of daily functioning.²⁸ Resource loss has been a risk factor of poorer outcome following natural disaster,²⁹ and has been implicated in decreased post-injury functional status.³⁰

In summary, emotional adaptation following physical injury is an important, but relatively neglected area of study. Identification of risk factors for negative emotional sequelae of injury may inform clinical practice and guide implementation of effective, early intervention to prevent later impairment. Personal, social, and material resources may be particularly influential factors and require further evaluation.

The present, cross-sectional, pilot study evaluated correlates of post-traumatic stress and depression in patients treated in the emergency medical setting following traumatic injury. It was hypothesized that personal, social, and material resources would be associated with post-injury adaptation. In particular, it was predicted that greater experiential avoidance, greater social constraints on discussing the traumatic experience, and greater loss of material resources would be associated with more symptoms of post-traumatic stress and depression following traumatic injury.

Methods

Procedure

All study procedures were approved by the Institutional Review Board for Human Subjects in Medical Research at the Stanford University Medical Center (SUMC). Participants were recruited through the Trauma Center at the SUMC. To be eligible for study participation, individuals had to be: (1) at least 18 years of age; (2) between one month and one year post-traumatic experience; (3) able to speak, write, read, and understand English; and (4) without traumatic brain injury. A target date was used to select patients from the Trauma Center database, who were between one month and one year since the traumatic event. The first 1,000 patients admitted since that date who met the eligibility criteria were sent a letter describing the study along with two consent forms, an information sheet, a refer-

ral list identifying local mental health services, and a stamped, pre-addressed envelope. Patients who returned a signed consent form to the study office were contacted by telephone, at which time the consent form was reviewed verbally and a telephone interview time was arranged. All assessments were completed using a telephone interview conducted by trained staff. Interview durations ranged from 30–60 minutes.

Assessments

Demographic Questionnaire—Demographic information was collected using a questionnaire designed specifically for this study. Data collected included: (1) age; (2) ethnicity; (3) marital status; (4) educational level attained; (5) annual household income; (6) full- vs. part-time employment; (7) time following traumatic event; (8) cause of injury; and (9) care received at the Trauma Center.

Stressfulness of Event—To quantify the subjective sense of threat posed by the injury, participants completed brief ratings of their experience. Whether or not the event/injury was perceived as a traumatic stressor was assessed by two “Yes/No” questions corresponding to the DSM-IV³¹ PTSD Stressor Criteria (i.e., A1: Did you perceive this experience as a threat to your life or a threat to your physical well-being?; A2: Did your response to this experience involve intense fear, helplessness, or horror?). Participants also were asked to rate how “traumatic” the experience was on a Likert-type scale from 1 (not at all) to 7 (very much).

Acceptance and Action Questionnaire (AAQ)³²—The Acceptance and Action Questionnaire (AAQ) is a nine-item scale designed to assess experiential avoidance, experiential control, psychological acceptance, and actions taken despite the experience of aversive private events.³² Items are rated on a Likert-type scale from 1 (never true) to 7 (always true) regarding how much each statement applies to the respondent (e.g., “I am able to take action on a problem even if I am uncertain what is the right thing to do”). Higher scores on the AAQ reflect greater experiential avoidance. In the present study, the Cronbach's alpha was 0.70.

Social Constraints Scale (SCS)³³—The 15-item Social Constraints Scale (SCS) assesses social responses that inhibit the expression of trauma-related thoughts and feelings.³³ Experiences with family/friends are rated from 1 (never) to 4 (often) for occurrence within the past month, and the sum yields a total score. Cronbach's alpha for the friends/family SCS scale has ranged from 0.89 to 0.92. Nine-month test-retest reliability is 0.71.³³ In the present study, the Cronbach's alpha was 0.93.

Conservation of Resources-Evaluation (COR-E)—The Conservation of Resources-Evaluation (COR-E) is a 74-item measure of resources that were lost following exposure to a stressor event. The present study used the Material-Loss subscale of the COR-E.^{28,34} In this subscale, 23 key material resources (e.g., adequate food, adequate clothing, money for transportation, money for children's essentials)

were rated using a Likert-type scale from 1 (no loss or threat of loss) to 3 (a great deal of loss), for “losses experienced since the injury which brought you in to the Emergency Department.” Internal reliability in previous studies has been 0.85–0.86.²⁸ In the present study, the Cronbach's alpha was 0.88.

Post-Traumatic Stress Disorder Checklist-Civilian (PCL-C)—The Post-Traumatic Stress Disorder Checklist-Civilian (PCL-C) assesses post-traumatic stress disorder (PTSD) symptoms in civilian populations and consists of 17 items that correspond to DSM-IV symptoms of PTSD.^{35,36} Respondents indicate how much they have been bothered by each symptom during the past month, using a Likert-type scale from 1 (not at all) to 5 (extremely). Respondents were asked to consider each symptom with respect to the experience that led to their emergency medical treatment. The responses can be used in two ways to arrive at putative diagnoses of PTSD.³⁶ The cutoff score method maintains that PCL-C total scores >50 suggest a diagnosis of PTSD. Using the symptom-cluster method, a symptom item rating of “moderately” or higher (i.e., a score of 3 or more on a 5-point scale) constitutes endorsement of that symptom. Individuals are candidates for a PTSD diagnosis if they endorsed one or more Cluster B (re-experiencing) items, three or more Cluster C (avoidance/numbing) items, and two or more Cluster D (arousal) items. A study using victims of motor-vehicle crashes or sexual assault victims indicate a correlation of 0.93 between the PCL total score with the Clinician-Administered PTSD Scale total score.^{37,38} In the present study, the Cronbach's alpha for the PCL-C was 0.90. Using the suggested criteria for the PCL-C, individuals likely to meet formal diagnostic criteria for PTSD were identified.

Center for Epidemiologic Studies Depression Scale (CES-D)³⁹—The Center for Epidemiologic Studies Depression Scale (CES-D) is a 20-item, well-validated depressive symptom measure. Respondents rate their experience of symptoms in the past week on a 4-point scale of intensity or frequency. A cutoff score of ≥ 16 is used to identify individuals with clinically significant depression.^{40,41} In the present study, Cronbach's alpha for the CES-D was 0.91.

Results

Participants

Of the 1,000 potential participants sent mailings, 70 returned a signed consent form, a response rate of 7.0%. However, five participants declined to be interviewed after consenting, nine were determined to be ineligible, and nine could not be reached by phone. Thus, the final sample included 47 participants who responded to the mailing and completed the interview. Based on information available through the Trauma Center database, it was possible to compare those who participated in the study ($n = 47$) and those who did not respond to the mailing ($n = 930$). Participants were significantly older than non-respondents ($p < 0.001$). Further, participants were more likely to be Caucasian, female, and married than were non-respondents ($p < 0.01$).

Variable	Maximum Score	Mean	Standard Deviation	Range
AAQ	63	29.4	8.6	10–50
SCS	60	22.4	8.6	15–50
COR-E	69	27.4	5.9	23–45
PCL-C Total	85	28.8	12.6	17–64
PCL-C Re-experiencing	25	8.6	4.6	5–23
PCL-C Avoidance/ Numbing	35	11.4	5.2	7–28
PCL-C Arousal	25	8.7	4.2	5–19
CES-D	60	11.4	10.5	0–44

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Table 1—Descriptive statistics for AAQ, SCS, COR-E, PCL-C, and CES-D ($n = 47$; AAQ = Acceptance and Action Questionnaire; COR-E = Conservation of Resources-Evaluation, material resources subscale; SCS = Social Constraints Scale; PCL-C = Post-traumatic stress disorder Checklist-Civilian; CES-D = Center for Epidemiological Studies-Depression Scale)

The 47 participants had a mean value for their ages of 35.5 ± 19.8 years; (range = 20–95 years), and 55.3% of the participants were male. Participant ethnicity was as follows: 70.2% Caucasian, 8.6% Hispanic, 8.5% Asian-American, 2.2% African-American, and 10.5% unknown. Marital status was 51.1% married, 19.1% divorced/separated, 17% never married, 8.5% widowed, and 4.3% cohabitating. Most participants (59.4%) had at least a college education. Annual household income was as follows: 10.6% <\$20,000, 12.8% \$20,000–39,999, 12.8% \$40,000–59,999, 6.4% \$60,000–79,999, 10.6% \$80,000–99,999, 46.8% >\$100,000. Most participants were working full-time (48.9%) or part-time (10.6%).

Participants were assessed at an average of 7.4 ± 3.14 months (range = 2.2–13.0 months) post-injury, secondary to a heterogeneous range of events. The most common cause of injury was a motor-vehicle crash (48.9%), followed by bicycle crash (17%), fall (12.8%), being hit by a car while on a bicycle (8.5%), being hit by a car while on foot (6.4%), water-related accidents (4.3%), and assault (2.1%). Injuries sustained ranged from lacerations to loss of consciousness to internal bleeding to multiple bone fractures. Treatment received in the Trauma Center ranged from evaluation to multiple surgeries to amputation.

The PTSD Criterion A1 (i.e., perception of threat to life or physical well-being) was endorsed by 70.2% of participants, while Criterion A2 (i.e., responded with fear, helplessness, or horror) was endorsed by 53.2% of the participants. The event/injury was experienced as a DSM-IV traumatic stressor (i.e., met both A1 and A2) for 48.9% of the sample. The mean rating of “how traumatic the event was” was 5.4 ± 2.0 (range = 1–7), with 42.6% of participants rating the experience as “very much” traumatic.

Descriptive statistics for the AAQ, COR-E, SCS, CES-D, and PCL-C are in Table 1. The scores on the Acceptance and Action Questionnaire ranged from a low

Variable	Age	AAQ	COR-E	SCS	PCL-C	CESD-D
Age	--					
AAQ	-0.38 ^b	--				
COR-E	-0.32 ^a	0.25	--			
SCS	-0.31 ^a	0.26	0.29 ^a	--		
PCL-C	-0.38 ^b	0.32 ^a	0.38 ^b	0.67 ^c	--	
CES-D	-0.21	0.52 ^c	0.42 ^b	0.46 ^b	0.59 ^c	--

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Table 2—Intercorrelations between Age, AAQ, COR-E, SCS, PCL-C, and CES-D ($n = 47$; AAQ = Acceptance and Action Questionnaire; COR-E = Conservation of Resources-Evaluation, material resources subscale; SCS = Social Constraints Scale; PCL-C = Post-traumatic stress disorder Checklist-Civilian; CES-D = Center for Epidemiological Studies-Depression Scale; ^a $p < 0.05$; ^b $p < 0.01$; ^c $p < 0.001$)

of 10 to a high of 50 with a mean value of 29.4 ± 8.6 . The scores on the CORE ranged from 23–45 with a mean value of 27.4 ± 5.9 .

The scores on the PCL-C total ranged from 17–64 with a mean value of 28.8 ± 12.6 . The component scores also are in Table 1. Based on the cut-off method (i.e., PCL-C total score ≥ 50), four (8.5%) participants were identified as PTSD+. Based on the symptom method (i.e., endorsement of one re-experiencing symptoms, three avoidance/numbing symptoms, two arousal symptoms), eight (17%) participants were identified as PTSD+.

The scores on the CES-D ranged from 0 to a high of 44 with a mean value of 11.4 ± 10.5 . Using suggested cut-off criteria for the CES-D (i.e., CES-D total score ≥ 16), 14 (29.8%) participants were identified as likely clinical cases of depression.

Univariate correlations between sociodemographic variables, hypothesized predictors, and symptoms of PTSD and depression are in Table 2. Only age was associated consistently and significantly with the other study variables. Younger participants reported greater resource loss, experiential avoidance, social constraints on disclosure, and PTSD symptomatology. Examination of intercorrelations among the AAQ, COR-E, and SCS did not raise concerns regarding multicollinearity. As predicted, greater resource loss, greater experiential avoidance, and greater social constraints were associated with greater symptoms of depression and PTSD.

To evaluate the unique variance in symptoms of PTSD and depression that were accounted for by experiential avoidance, resource loss, and social constraints, two parallel, simultaneous, multiple regression analyses were performed, using the PCL-C and CES-D total scores as the dependent variables (Table 3). Age was included as a predictor in both equations. The four predictor variables accounted for 51% of the variance in PCL-C total scores. Only the perception of social constraints on disclosure about the traumatic experience was a significant predictor.

Predictor	PCL-C	t-value (41)	CES-D	t-value (41)
Age	-0.12	-0.98	0.13	0.98
AAQ	0.09	0.78	0.42 ^b	3.32
COR-E	0.16	1.34	0.27 ^a	2.13
SCS	0.56 ^c	4.79	0.31 ^a	2.52
Multiple R	0.72		0.67	
F (4, 42)	10.96 ^c		8.46 ^c	
Variance (%)	51		45	

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Table 3—Beta weights for PCL-C and CES-D total scores ($n = 47$; AAQ = Acceptance and Action Questionnaire; COR-E = Conservation of Resources—Evaluation, material resources subscale; SCS = Social Constraints Scale; PCL-C = Post-traumatic stress disorder Checklist—Civilian; CES-D = Center for Epidemiological Studies—Depression Scale; ^a $p < 0.05$; ^b $p < 0.01$; ^c $p < 0.001$)

Greater social constraints were associated with greater PTSD symptomatology.

Regarding prediction of depressive symptoms, the four predictor variables accounted for 45% of the variance in CES-D total scores. Social constraints, experiential avoidance, and material resource loss were all significant predictors. Greater social constraints, greater experiential avoidance, and greater resource loss were associated with greater depressive symptoms.

Discussion

In this sample of injured patients seen in a hospital trauma center, perceived social constraints on disclosure about the traumatic experience was a significant predictor for the development of PTSD. Social constraints, experiential avoidance, and material resource loss were significant predictors of depression. These predictors accounted for significant proportions of the variance in these key outcomes: 51% of the variance in PTSD and 45% of the variance in depression. These findings extend prior research on adjustment following traumatic injury and have implications for clinical care and future research.

The present study is the first to examine the impact of social constraints upon adjustment to traumatic injury. Social constraints can be viewed as overt or covert negative responses to disclosure of trauma-related concerns and are hypothesized to impact adjustment by their inhibition of cognitive-emotional processing of the trauma in question.²² Studies have demonstrated a significant relationship between social constraints and distress in bereaved mothers,²³ children exposed to violence,⁴² and cancer survivors.^{24,43–46} Generally, this body of research suggests the importance of examining the impact of interpersonal transactions on emotional processing in recovery from trauma. Social constraints may create an invalidating social envi-

ronment and prompt individuals to avoid thinking or talking about the traumatic experience, and more broadly, may interfere with recruitment of social support.

The association in this study of loss of material resources with post-injury depression is consistent with previous work showing that greater loss of resources is predictive of distress following natural disaster.^{29,47} Loss of wages, employment, transportation, and other resources may create financial strain and contribute to distress by interrupting daily activities and threatening the quality of life. On average, participants in this study were more than seven months post-injury and reports of loss of resources were common, suggesting that the economic impact of traumatic injury is both prevalent and enduring.

Previous investigations have found that both negative interpretation of intrusive ideation and coping through avoidance pose obstacles to post-injury, emotional adjustment.^{2,20} The present study extends those findings by examining an important, but under-studied construct, experiential avoidance following injury. Experiential avoidance or difficulty accepting and taking action in the face of strong negative emotions was associated with post-injury depressive symptoms. Post-injury adaptation is determined, in part, by one's ability to tolerate the naturally occurring range of negative emotions and upsetting memories and act constructively.¹⁸ Attempts to ignore, avoid, or withdraw from such internal experiences may impede cognitive-emotional processing and interfere with practical steps that can be taken to address residual problems.

The present study has a number of important methodological limitations. Most importantly, the extremely low response rate to the survey, small sample size, and significant differences between the study sample and the larger population of trauma survivors seen at SUMC suggest that findings may not be generalizable to the general population of trauma service patients. Given the retrospective, self-reporting design of this study, it is impossible to establish causal relationships among the hypothesized predictor constructs and emotional adjustment. The observed relationships may have been affected by the impact of current negative emotional state on self-reporting of social constraints, coping, and loss of resources. Assessment instruments in the current study were circumscribed and did not assess dissociative symptoms or broader functional or quality of life outcomes. Despite these significant limitations, this pilot analysis suggests some potentially important predictors of post-trauma problems that have received little research attention to date.

Future prospective, longitudinal investigations evaluating the impact of social constraints, resource loss, and experiential avoidance should more effectively explicate the adjustment process following injury. Measurement of a broader range of peri- and post-traumatic responses, including dissociative symptoms, would better characterize patients' distress profiles. Further, assessment of functional outcomes (e.g., family, occupational, general quality of life) may help to distinguish stress responses "within normal limits" from more extreme and disruptive reactions. In addition, more fine-grained analyses of impact of time

since trauma (e.g., looking at specific subgroups) could better characterize the post-injury adjustment trajectory.

If these findings are supported by future research, they would have practical clinical implications. Assessment of personal coping style, receptivity of the social network, and potential material resource loss following traumatic injury may facilitate identification of individuals at risk for poorer post-injury adaptation and inform development of novel psychosocial interventions. Patients judged to have limited support and/or a tendency toward avoidance may benefit from brief psychoeducational interventions that focus both on the individuals and their social network or family system. While much post-trauma care is broadly consistent with the goal of minimizing resource loss, it will be important to determine how helping interventions, such as referral to social work programs, affect resources and whether resource maintenance is a factor in successful outcome.

Conclusions

Traumatic injury is associated with a range of negative psychosocial sequelae. Identification of those at-risk for poor post-injury emotional adaptation may enable more effective screening and early intervention in clinical settings. Personal, social, and material resources may have an important impact on adjustment and may be appropriate targets for assessments and interventions aimed at preventing post-injury impairment.

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